FEDERAL AID
ANNUAL RESEARCH PERFORMANCE REPORT

ALASKA DEPARTMENT OF FISH AND GAME
DIVISION OF WILDLIFE CONSERVATION
PO Box 25526
Juneau, AK 99802-5526

PROJECT TITLE: Analysis of nitrogen budget in moose.

PRINCIPAL INVESTIGATOR: William B. Collins

COOPERATORS: Don Spalinger, Scott McArt

FEDERAL AID GRANT PROGRAM: Wildlife Restoration

GRANT AND SEGMENT NR: W-33-3

PROJECT NR: 1.59

WORK LOCATION: Game Management Units 13 and 20

STATE: Alaska

PERIOD: 1 July 2004–30 June 2005

I. PROGRESS ON PROJECT OBJECTIVES SINCE PROJECT INCEPTION *(Do not complete for projects only 1 year old.)*

OBJECTIVE 1: Determine nitrogen availability in major forages of moose in ranges of varying productivity.

With development of our new method for assaying protein-tannin binding, we have begun determining digestible nitrogen in forage samples we collected in summers 2003 and 2004. We have completed approximately 2/3 of the samples.

OBJECTIVE 2: Quantify diets of moose and determine daily intake of digestible nitrogen during summer and winter.

We have continued raising and training 4 moose for foraging trials in the Nelchina Basin. We have determined the in vivo digestibilities (rates and total) of 26 summer or winter moose forages.

OBJECTIVE 3: Determine nitrogen requirements of moose through balance trials.

We have conducted 5 digestion balance trials with each of 4 moose. We have collected another set of summer forages that will be used in trials beginning in December 2005.

OBJECTIVE 4: Determine appropriate assay for assessing effects of tannins on protein digestibility in moose.

We have a developed a new technique for doing protein-tannin binding assays on microplates. This technique requires less than half the time per sample to complete, and the laboratory supplies required to do each sample cost approximately $2.50, versus $28.00 by the older technique. Data obtained by our technique more accurately estimate amount of protein bound per amount of forage when regression analysis is used, since different negative intercepts for this relationship occur with different forages. For example, diamond willow may need 5 mg of plant material to start binding protein, whereas dwarf birch only needs 2 mg to start binding protein; thus, without doing a regression to find these 2 different negative intercepts the protein-tannin binding capacity would be misrepresented for both plants. A regression comparison of our micro technique to the older method (Robbins et al. 1987) has an R^2 of 0.98, and the slope is 0.99, indicating a good, nearly 1:1 relationship between techniques.

II. SUMMARY OF WORK COMPLETED ON JOBS IDENTIFIED IN ANNUAL PLAN THIS PERIOD

JOB 1: Moose forage nitrogen and protein binding capacities of moose forages.

We have continued monitoring the seasonal nutrient and tannin concentration of principal moose forages in the Nelchina Basin and Denali National Park.

With development of our new protein-tanning binding assay, we have been able to complete tannin assays on all forage samples we have collected to date.

JOB 2A: Forage selection and food habits by tractable moose in Nelchina Basin.

Site preparations for this work were completed in spring 2005, but summer season work was delayed by concerns over transmission of diseases by tractable moose being moved to and from field research sites. Concerns have been resolved, and field trials will begin in fall 2005.

JOB 2B: Moose diet based on fecal microhistological and alkane analysis.

No work has been done on this job.

JOB 3: Nitrogen balance trials and determining the digestibility of nitrogen by moose in presence of forage tannins.

We have conducted in vivo digestion trials on 4 common moose forages (4 moose each). We have also completed one set of nitrogen balance trials in 4 moose to measure urea recycling, by pulse dosing with 13-C urea and measuring concentrations in the urine at timed intervals over 24 hours.

III. ADDITIONAL FEDERAL AID-FUNDED WORK NOT DESCRIBED ABOVE THAT WAS ACCOMPLISHED ON THIS PROJECT DURING THIS SEGMENT PERIOD

None

IV. PUBLICATIONS

V. RECOMMENDATIONS FOR THIS PROJECT

VI. APPENDIX

VII. PROJECT COSTS FOR THIS SEGMENT PERIOD

Stewardship Investment items purchased: *list any equipment or other items purchased for which the cost of the individual item was $5,000 or more (include cost)*

Total Costs
FEDERAL AID SHARE $35,549 STATE SHARE $ 11,850 = TOTAL $47,399

VIII. PREPARED BY:

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SUBMITTED BY:

Earl Becker
Research Coordinator